

## THE LIFE-HISTORY OF ELLIDA CANIPLAGA.

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This species, more commonly known as *Ellida gelida* Grt., has been a rarity in collections. Nothing has been recorded on its larva. Recently Mr. George Krautwurm, of Pittsburgh, Pa., in correspondence with the Department of Agriculture, mentioned that the larva was known to him and that he could supply eggs. Dr. Howard kindly turned over to me the material sent by Mr. Krautwurm and I obtained the following life history. *Ellida caniplaga* flies very early, in April. There is a partial second brood, flying at the end of June and first of July, and it is these scattering individuals that usually come into the hands of collectors. Mr. Krautwurm obtained some 75 pupæ from his lot of eggs at Pittsburgh, and none of these emerged the same season. Of the 20 pupæ which I obtained from a part of the same lot of eggs, but which were raised at Washington, D. C., all but three emerged the same season, or attempted to, for most of them were crippled. The food plant is the linden (*Tilia americana* Linn.). The little larvæ had hatched and were feeding on the young, undeveloped leaves when received. They rested on the backs of the leaves, curled in an incomplete spiral. The dark form of the mature larva is peculiarly marked.

*Egg*.—Shape of two thirds of a sphere with flat base and slight tendency to the conoidal form; ochreous flesh color or pale brown, not shining; a round, translucent luteous spot at the vertex; surface finely, obscurely, hexagonally reticulate, the reticulations smaller at the micropyle. Diameter 1.1 mm., height .7 mm. The larva issues by eating a semicircular hole at one side of the vertex.

*Stage I*.—Head rounded, bilobed, higher than wide, mouth pointed; erect; shining black, mouth and base of clypeus brownish; width .4 mm. Body cylindrical, normal, feet all used, but the anal pair slender; joint 12 with a large, cushion-shaped, dorsal hump; joint 11 weak and smaller, else the segments subequal. A small, narrow, transverse, cervical shield, small anal plate, the thoracic feet, leg plates and tubercles shining black. Body translucent yellowish-white, the food showing green; a rounded dorsal patch on joints 3 to 10 and 12, between tubercles i and ii and covering tubercles i, of dull red brown,

shining like the skin, faint on joint 3, large and covering the hump on joint 12. Tubercles moderate, very distinct, rounded, rather prominent, normal, no subprimaries; ia and ib separate, iia and iib separate, iv on the abdomen behind the spiracle. Segments rather weakly annulate. Tubercles i on the apex of the hump of joint 12 are enlarged, separate. Sometimes there are no dorsal spots on joints 3 and 4. Setæ stiff, black. When first hatched the tubercles are not black, the dorsal spots are dull brown and diffuse while the one on the hump of joint 12 is blood red.

*Stage II.* — Head rounded quadrate, angled on the lower sides, flattened before, higher and wider than joint 2; clypeus small, vertex broadly shallowly notched, erect, dark smoky brown, broadly luteous in the sutures of the clypeus, vertices of lobes blackish, width .8 mm. Body cylindrical, joint 12 with a conical dorsal hump, nearly as high as the width of the segment; feet moderate, the anal pair about same size as the others, perpendicular, not extended backward. Segments obscurely 4-annulate. Not shining, whitish with a yellowish tint, translucent, the food appearing green. Cervical shield small, transverse, smoky; dorsal patches on joints 3 to 10 small, diffuse, dull brownish-red, the hump on joint 12 brighter red. Tubercles minute, concolorous, obscure; setæ small, slender, short, black. Feet all pale. Later the feet were testaceous, the head nearly uniformly dark brown; dorsal spots more distinct and rounded, marked in pale dots by tubercles i and ii. Rarely the spots are conjoined into a moniliform band, narrowed before, broken at joint 11. Still later there appears a broad, opaque, white, subdorsal band. The larva rests on the back of a leaf with the head curved and touching the middle of the body.

*Stage III.* — Head higher and broader than joint 2, higher than wide, convex flattened before, obliquely flattened towards vertex, rounded squarish, the vertex shallowly notched; mouth roundedly projecting; clypeus less than half to vertex; white on each side of the median suture above clypeus, else shaded with blackish luteous; vertices of lobes black, the patches conjoined narrowly across the vertical notch; labrum pale; width 1.1 mm. Body moderate, a little smaller behind; joint 12 with a dorsal conical hump, not large. Anal feet slight, used. Segments 5-annulate. Whitish, translucent, a broad, opaque white, subdorsal band, weakly contrasted; dorsal patches red-brown, forming a confused band on joints 3 to 5, streaked on the

annulets, on 6 to 10 and 12 forming neat round spots, very slightly elevated, marked in white by tubercle *i* and an annulet groove; a slight dot on joint 11 and on 13 anteriorly; the spots of joints 6 and 7 are produced backward a little on the dorsal line. No shields; tubercles and setæ obscure, concolorous, whitish. Another larva had the head white with brown-black dots at the apex of each lobe and on eye; subdorsal band yellowish; dorsal spots smaller, finally fading out except for tiny paired dots. The subdorsal line is widened and yellow-blotched on the segments and there is a narrow suprastigmatal white line and traces of a fine lateral one.

*Stage IV.*—Head shaped as before, held obliquely; yellowish-green over the lobes, clypeus and a space below the eyes greenish; a small, neat, elliptical, black patch on the summit of each lobe; eyes in a small black spot; labrum whitish, jaws yellowish at base, antennæ very small and pale; width 2.5 mm. Body slender, cylindrical, joint 12 with a sharp, triangular dorsal hump, more oblique before than behind, not as high as the diameter of the segment; segments coarsely 5-annulate, the incisures depressed. Feet normal, equal, resembling *Lophodonta*. No shields; transparent green, pulsations of dorsal vessel visible; an opaque subdorsal band, widened dorsally in the centers of the segments to touch its fellow, white on the edge, yellow below, the color darkest centrally on the segments; tip of hump on the anterior slope dark red or a blackish-red dorsal patch on the second annulet on joints 8 to 10 also. A narrow, straight line just below the broad subdorsal line and in part fused with it; similar lateral and suprastigmatal lines uniformly pale yellow. Tracheal line visible; spiracles whitish; no marks below; setæ short, whitish, the tubercles invisible. Later the dorsal spots faded to a faint vinous shade, but leaving a dark dot on tubercle *i*. In the pale larva a narrow white line appeared subventrally. The larva rests on the vein of a leaf, the body curled in a half spiral, the head crossed over the middle of the body and elevated.

*Stage V.*—Head rounded, higher than wide, vertex retreating, shallowly notched; clypeus small, slightly depressed, labrum incised at sides, emarginate, with the mandibles forming a rounded, projecting mouth; pale green, slightly shagreened, yellow shaded outwardly on the lobes and each side of median suture; a rounded black patch on summit of each lobe, over eye and covering distal three fourths of jaw; clypeus deeper green; antennæ small, slender, pale; width 3.5

mm. Body cylindrical, normal, joint 12 with a dorsal angled hump, forming a low, subconical projection, joint 13 tapering a little, else subequal, joint 2 smaller than the head. Segments coarsely 5-annulate, annulet 2 the highest. Translucent whitish-green, the feet very pale; subdorsal line opaque, yellow, white on annulets 1 and 5 and on its upper edge, widened dorsally on the segments to touch its fellow on the third annulet on joints 6 to 11, widened laterally on joint 2, but on the other segments straight on its lower edge. Three fine lateral lines (lower subdorsal, lateral and suprastigmatal), pale yellow, straight, the upper in part confluent with the subdorsal on annulet 1, the three separated by equal spaces of the translucent ground color. A broken, somewhat waved, narrow, pale, substigmatal line. Dorsal geminate dots of dark red more or less distinct on joints 5 to 8, dorsal of tubercle 1 on the slightly raised second annulet, a single spot on the summit of the hump on joint 12. Tubercles invisible, setæ minute, the dorsal ones dusky. This is the palest form. In others the red marks vary greatly. One had the dorsal spots large and single on joints 3 to 10 and 12. The darkest forms have the head nearly white, flushed with pink over the faces of the lobes; lines all yellow except the edge of the subdorsal next to the red spots. There may be an incomplete line of dark red between the subdorsal and lower subdorsal lines; dorsal dark red spots filling all the dorsum except for the subdorsal line. Or the whole larva may be shaded with dark vinous red, the color crossing the subdorsal line at annulet 1 and forming great blotches over the sides.

The larvæ formed slight cocoons in the earth. The change to pupa took place immediately, even in those individuals that did not emerge till the following year. The pupa is cylindrical, rather elongate and tapering slightly at both ends, smooth, rather light brown, shining. The cases are shagreened, the wing veins showing rather plainly; abdominal segments lightly, uniformly punctured, the three movable incisures finely granular. Cremaster a stout spine, terminated in a number of irregular hooks. Length 20 mm., width 6 mm.